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# The Anthropocene and Geography III: Future directions

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## Abstract

This is the last of three papers that explore the relevance of 'the Anthropocene' (and the related idea of 'planetary boundaries') to present and future research in Geography. The first paper (The Anthropocene and Geography I: The back story) summarised the origins and evolution of the proposition that the Holocene has ended. The second paper (The Anthropocene and Geography II: Current contributions) then mapped-out the relatively few, but varied, contributions that geographers have so far made to assessing or advancing this proposition. This final instalment looks ahead. It offers readers informed speculation on how future discussions of the Anthropocene might take shape in Geography. These discussions may matter for a great many others besides geographers in the years ahead. Given their epochal meanings and enormous implications for humans, the Anthropocene and planetary boundaries ideas stand to become societal keywords that, along with some other collateral terms, might organise debate and action about one of the greatest human questions, namely: 'how should we live?'.



## Keywords

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**Abstract** This is the last of three papers that explore the relevance of 'the Anthropocene' (and the related idea of 'planetary boundaries') to present and future research in Geography. The first (Xxxxxxx, 2014a) summarised the origins and evolution of the proposition that the Holocene has ended. The second (Xxxxxxx, 2014b) then mapped-out the relatively few, but varied, contributions that geographers have so far made to assessing or advancing this proposition. This final instalment looks ahead. It offers readers informed speculation on how future discussions of the Anthropocene might take shape in Geography. These discussions may matter for a great many others besides geographers in the years ahead. Given their epochal meanings and enormous implications for humans, the Anthropocene and planetary boundaries ideas stand to become societal keywords that, along with some other collateral terms, might organise debate and action about one of the greatest human questions, namely: 'how should we live?'.

**Keywords** The Anthropocene; planetary boundaries; human-environment relations; unity of Geography.

## Introduction

'The Anthropocene' is an epochal idea that was invented, and is currently being debated, by a group of environmental and Earth scientists hailing from several subject areas. In recent years it has been accompanied by the concept of 'planetary boundaries'. Though both terms emerged after a quarter century of research into 'global environmental change' by geographers and others, their originators were (and are) trying to push beyond this now familiar idea to signify even larger anthropogenic forces at work. In the period ahead, it is possible – though far from certain – that one or both neologisms could become what cultural critic Raymond Williams (1976) once called 'keywords'. These are terms that assume centrality in everyday discourse across the full range of social arenas. They become embedded in various narratives and 'storylines' about the way the world is, or should be. In their early years, these words often produce wide-ranging debate about fundamental questions of how people relate to each other and, perhaps, to non-humans too.[1] The Anthropocene and planetary boundaries ideas are, despite their scientific origins, immensely productive of such extra-scientific questions.

The ideas have *prima facie* relevance to Geography, and it is no surprise that a few geographers have already been inspired to say something about both of them (for a review, see this essay's predecessor: Xxxxxxx, 2014b). I say

[1]Later on in their social lives keywords can be central terms in societal discourse but get leached of substantive meaning – almost becoming 'empty signifiers'. According to some, this has been the fate of 'sustainability' since the late 1990s.

this for two reasons. First, both terms refer to ongoing Earth surface changes occurring across the whole spectrum of processes and forms that are studied by the major branches of physical geography. Second, these changes are said to be so profound as to require searching self-examination about the habits of social thought and action that have given rise to them. The changes, if taken seriously, oblige societies to 're-graph the geo' imaginatively and practically. After all, future environmental changes could extend well beyond those normally associated with anthropogenic climate change, so a 'business as usual' approach seems ill-advised. Given that Geography is among the few subjects disposed to studying humanity's relationships with its 'natural' and created environments, it may have something to say about *both* the 'physical' and the 'human' dimensions of life after the Holocene. This is all the more likely because of a mass of prior research into 'the human dimensions' of global environmental change, traceable back to the mid-1970s. This paper offers an informed discussion of how different geographers might, alone and together, contribute to wider discussions of the Anthropocene and planetary boundaries. As such, it explores the intellectual potential both ideas hold to take geographers beyond the smattering of recent publications reviewed in the second part of this triptych (2014b). That review revealed that a set of rather diverse and sometimes disconnected discussions of the Anthropocene and planetary boundaries are evident across Geography as a whole. That might soon change and a larger, more 'woven' discussion could take shape (or not, as the case may be) that rethreads extant investigations into the alterations of the Earth wrought by humanity.

Among other things, the two concepts invite geographers to revisit their subject's heritage as a 'world discipline' geared to understanding Earth as an integrated, complex, multi-scalar and differentiated web of societal and biophysical interactions (cf. Bonnett, 2003). In this light, some will no doubt hope that concepts like these can help to unify a famously 'divided' subject or better insert it into high-level policy debates. But there are other available aspirations and possibilities too, and these will be explored in this paper. At base, the question is simple to state but tough to answer. Given that Geography houses environmental science, social science and humanities perspectives in one disciplinary space, what relationships should these perspectives have when focussed on significant objects of common concern like the Anthropocene and Earth's planetary boundaries?

As my opening paragraph implies, this question not only matters for Geographers. If the Anthropocene and planetary boundaries ideas do indeed become future keywords, geographers are (or should be) among those who will be responsible for investing them with significance – cognitively, morally

and even aesthetically. A number of practitioners have shaped understandings of global environmental change among non-academics for some time (see, for instance, Liverman's [1999] *fin-de-millennium* assessment), but might the character of this shaping be boosted or challenged by the suggestion that a phase-shift in Earth history is afoot? Given how magisterial the two concepts are, crucial questions arise about who will speak about them and how. It is thus important to reflect on the sorts of claims that we, as geographers, might want to make in what should be a debate where many voices and many forms of knowledge would ultimately feature (to greater-or-lesser degrees). As will become clear, there can be no single future direction for discussions of the Anthropocene and planetary boundaries that geographers of various stripes can, or should, sign-up to. The challenge, I will suggest, is to leverage Geography's extraordinary perspectival diversity to enrich wider discussions of a vital subject – one more profound in its implications than the now familiar question of what future atmospheric warming portends for life on Earth.

Note that where Xxxxxxx (2014a) and Xxxxxxx (2014b) can be read alone, this paper makes relatively little sense without readers having first understood the contents of the latter.

## Disciplinary foresight and informed speculation

Before I proceed to this essay's main aim and subject matter, I want to offer some telegraphic thoughts about the sort of informed speculation ventured in the pages to come. When considering any future scenario there is always the risk of ungrounded speculation and wishful thinking. In light of this, I want to anchor the following discussion in six overlapping ways. First, and most obviously, I take my leave from the previous paper (Xxxxxxx, 2014b) – that is to say, from the published discussions of the Anthropocene authored by various contemporary geographers. These discussions point to already live lines of inquiry that are likely to persist. Secondly, however, some awareness of how geographers have examined anthropogenic climate change (ACC) and wider global environmental change (GEC) is also important. I say this because ACC and GEC are 'promiscuous' topics that speak to human, environmental and physical geography; because they have been extensively examined by geographers; and, finally, because they are precursors of, yet subsumed by, the Anthropocene and planetary boundaries ideas. For these three reasons, extant inquiries into ACC and GEC by various geographers constitute one of the most obvious bases for determining the path that future inquiries into the Holocene's proclaimed end might take. These inquiries, as I interpret them, are extraordinarily heterodox in terms of topical focus and analytical approach (no bad thing in my view). Moreover, to the extent they are have engendered intra-disciplinary engagement, there appear to be certain kinds of integration

and dialogue that are favoured and certain forms of knowledge that 'travel' better than others among Geography's many sub-communities. For instance, research into certain people's social vulnerability to ACC has often been seen as an important complement to the science of recent environmental change practised by many physical geographers. However, other environmental research by human geographers – such as that inspired by the writings of Bruno Latour, Donna Haraway or Isabel Stengers – appears to be relatively overlooked by many researchers in the discipline. The questions posed and the languages used are, perhaps, deemed too foreign to key-in to research ongoing in several parts of environmental and physical geography.

Thirdly, it is also important to have a wider sense of how Geography's current complicated internal configuration and variegated external linkages have conditioned all of the above. For instance, as we saw in Xxxxxxx (2014b), many physical and environmental geographers are involved in cross-disciplinary externally funded research, framed by any given funding body's call for research; meanwhile, others are perhaps less swayed by these centripetal forces and reference their research to sub-disciplinary debates within Geography. Fourth, emerging discussions of the Anthropocene and planetary boundaries in the wider social sciences and humanities are clearly relevant to how some human geographers will approach these topics. Indeed, a few of these geographers are already participants in these wider discussions.[2] Fifth, because biophysical science is so central to governmental policy and everyday life in the modern world, we need to be mindful of 'big debates' about the scientific enterprise. Among them are arguments for 'mode 2' inquiry and 'post-normal' research, where scientists are enjoined to respond directly to the social contexts in which they work. Finally, we should be aware of various contemporary calls in the wider physical and social sciences for new modes of inquiry into what are sometimes called the 'grand challenges' of the coming century.[3] Some of these calls have been formally referenced to the discussions summarised in Xxxxxxx (2014a), while others have entered Geography in the form of recent discussions about 'inter-', 'multi-' or 'trans-disciplinarity' (themselves revisitations of earlier debates about the 'dis/unity of Geography'). They will shape the broader research community's sense of what is possible and desirable in respect of future Earth surface research and policy.

[2]A good example is Nigel Clark, whose recent writings on the Anthropocene were discussed in Xxxxxxx (2014b). Clark has published outside human geography journals on many occasions, and his 2011 book *Inhuman nature* was written as a cross-disciplinary intervention.

[3]Among these challenges are eliminating disease, providing clean water, preventing famines and eradicating chronic poverty.

With these six as reference points we can, perhaps, narrow the range of potential discussion a little so that there are fewer 'ifs and buts'. Even though space prevents me making detailed reference to any of them, over twenty years of tracking publications in each area informs what follows and suggests a complex force-field of pressures and prospects. Of course, as part of understanding how future discussions *might* unfold, we must necessarily consider different conceptions of how they *should*. Rather than impose my own normative reading, I prefer to identify some of the alternative epistemic and political positions that already structure how claims about the Holocene's end are being presented, so too claims about ACC and GEC. Describing these alternatives offers us a sense of how much (or little!) common ground might ultimately be explored by potential interlocutors in geographical, and wider, debates about Earth's future.

Reflective of this distinction between 'might' and 'should', the remainder of this paper is organised into two main parts. The former will focus on likely research developments, the latter on arguments about what ought to happen if Geography is to contribute meaningfully to life in a post-Holocene world. This second part thus constitutes an imagined critical commentary on developments foreseen in the first.

## More of the same? An incremental growth scenario

*Possible trends*

The first, and most obvious, scenario we can envisage is a steady progression along the lines described in this paper's predecessor. From the perspective of physical and a science-inflected environmental geography this could involve three things. First, the 'proposers' discussed in Xxxxxxx (2014b) – namely, Erle Ellis, Eric Lambin, Diana Liverman and Tim Lenton – might continue to advance the idea that the Holocene has ended, and argue for a more socially relevant form of environmental science and, by implication, more environmentally relevant social science. They might be joined by like-minded geographers, such as Billie Lee Turner III – a leading proponent of what is called 'land change science' (see, for example, Turner, Lambin & Reenberg, 2007). In this they would be continuing to write less as 'geographers' alone and more as members of extended biophysical science networks linked with the International Geosphere-Biosphere Program (IGBP) and other GEC research endeavours. Several network participants, such as atmospheric physicist Hans Shellnhuber, have been long-time advocates of Earth System Science (ESS) – a particular form of 'global physical geography'. It is conceivable that some physical and environmental scientists might find the Anthropocene and/or planetary boundaries congenial concepts for their attempts to secure future research funding for the sort of joined-up science ESS represents. The resulting

publications would see not a few of them write as ‘concerned scientists’ rather than ‘pure scientists’ – continuing a long (but thin) tradition in Geography that goes back to George Perkins Marsh in 1864. Second, the ‘assessors’ discussed in Xxxxxxx (2014b) would either grow in number or move on to other concerns – the latter is highly likely if the International Commission on Stratigraphy (ICS) decides that the Anthropocene is not (yet) a new geological epoch. Third, regardless of the ICS’s view, it is likely that many physical and environmental geographers will use the Anthropocene and/or planetary boundaries as general framing concepts – semantic ‘scenery’ for their own specialist research into anything from flooding to periglacial landform changes.

On the human side of geography, things would continue to look rather different. Practitioners would continue to accept the broad conclusions of the science community, and explore their societal implications in a normative sense. Some might (after political geographer Simon Dalby) analyse the way various important social actors say and do things in the name of the Anthropocene and planetary boundaries, perhaps mindful of Erik Swyngedouw’s repeated claims (e.g. 2010a, 2010b) that we live in a ‘post-political’ era. By this he means a period where political and economic elites in the West have successfully reduced challenges to their agendas without taking an overtly authoritarian turn. Others might follow J-K Gibson-Graham’s lead and undertake participatory research designed to engender alternative political practices for a more democratic, decentralised and ecologically diverse world. Still others might, like Jamie Lorimer, Paul Robbins and Sarah Moore, argue that specific sorts of Anthropocenic science can (or should) contribute actively to such experimental practices. This could inspire some of the more philosophically-minded analysts, like Nigel Clark and Kathryn Yusoff, to consider the sort of norms, relationship and institutions that might concretise the kinds of novel sensibilities they have been advocating.

If the above was to eventuate, one could well envisage several human geographers who currently work on ACC and GEC joining the conversation about the Anthropocene and planetary boundaries. Many of these have an eye on public policy and how one can change the mainstream e.g. consumer and business behaviour. Indeed, many funding bodies and biophysical scientists are now calling on social scientists and humanities scholars to shape public and political understandings of how to respond to an Earth undergoing major physical transformation (e.g. Reid *et al.* 2009). How unorthodox these scholars can be in such arenas is typically limited, which is why others take their distance from current policy, seeing it as insufficiently radical and reflective of a narrow range of socio-ecological values. Accordingly, while some might want to contribute to high-level initiatives like the Earth System Governance Project

(so joining Diana Liverman: see Biermann *et al*., 2010), critics will dislike their in-built assumptions that capitalism and nation-states are non-negotiable givens.

Beyond this, one can easily imagine scientific discourse about the Holocene's end further energising ongoing research by human geographers into: 'ethical consumption', 'green infrastructure', media reporting of environmental issues, market-based environmental governance (and alternatives to it), low carbon energy supply, corporate environmental responsibility, 'sustainability transitions', policy sharing and learning in transnational policy networks, multi-level and cross-scalar governance, (re)localisation of food supply, perceptions of environmental risk, effective science communication, participatory expertise, the 'green economy', community-level natural resource management, inter-governmental environmental stewardship, 'ecological modernisation', environmental in/justice, the role of the arts in responding to environmental change, and living well with companion species (this list is not exhaustive!). Likewise, one can imagine it dovetailing with current inquiries into how one can achieve rural and urban 'development' in the global South in the face of various new environmental changes and hazards – ones partly resulting from rich-world 'externalities' imposed upon the physical environment and distant others.

This research already involves political, cultural, economic, social, rural, urban and development geographers of various analytical and political persuasions. The Anthropocene and planetary boundaries ideas could inspire some knitting-together of their often specialised and sometimes disparate inquiries. They might also engender richer debate between human geographers about the sort of local, national and global futures that are only possible but desirable. At the very least, one can expect many more human geographers to use the two concepts as framing devices in the way I suggested physical geographers might do above. Even if only shallow in some cases, such use might bolster the overall 'environmental turn' that human geography has in different ways undergone since the early 1990s.

In all this, human geographers would largely be accepting the claims of Anthropocenic scientists as credible ones. However, it is conceivable that some might want to raise critical questions about the science. I say this because several practitioners have previously 'deconstructed' scientific representations of the non-human world, attending to their hidden 'social' content and the conditioning role that the sites of scientific activity play (e.g. laboratories, field stations etc.). In the case of the Anthropocene and planetary boundaries, a scientific network of 'proposers' is speaking on behalf of the *totality* of Earth surface phenomena – an extraordinary act of representation. Among other

things, one can legitimately attend to the metaphors and value assumptions that structure the content of these scientists' pronouncements. This would be consistent with the constructively critical take on scientific 'objectivity' offered in years past by geographers like David Demeritt (2001) and Mike Hulme (2010). It would be sceptical of Lorimer, Robbins and Moore's view that Anthropocenic science can get over 'ecological anxiety disorder' in the way some biogeographers and conservation biologists appear to have.

The planetary boundaries idea, in particular, seems to contain certain normative assumptions about biophysical 'limits to growth', and recalls earlier attempts by scientists to derive large 'ought' arguments from apparent statements of 'fact' (see Blanchard, 2010; Sayre, 2008). Along with other analysts of scientific practice, scientific representation, 'science-led' public policy and the use of scientific expertise, some human geographers might point to the perennial dangers of a 'scientised politics' conducted in the name of avoiding 'critical thresholds' and the like. Scientised politics describes forms of political debate and decision-making where certain options are closed-off from the get-go because of the supposedly scientific 'realities' determining what is considered to be socially possible looking ahead. Identifying scientised politics does not imply an anti-science stance or entail the suggestion that science is simply politics by other means. Instead, it is a defence against the unwarranted extension of scientific authority into areas where plural, democratic debate ought to determine political outcomes.[4]

If even half of the above were to eventuate, geographers would be saying a lot about a post-Holocene world, extending well beyond the scientific issues. This cacophony of voices would echo those currently talking about ACC and GEC. But one doubts that Geography as a discipline would be perceived by others as offering distinctive insights by virtue of the sheer range of separate contributions practitioners would be making – often working collaboratively in large teams with non-Geographers. Some of the more radical claims made by certain human and environmental geographers would likely also register more with their Geography peers than beyond in the world of public policy.

*Likely absences*

[4]If scientific discourse about the Anthropocene and planetary boundaries begins to seriously influence the thinking of leading governments worldwide, it will inevitably come under attack in the way climate change science did from the early 1990s – especially in the USA where organised 'sceptics' systematically sought to discredit the conclusions of the Intergovernmental Panel on Climate Change. However, bad-faith assaults on science should not be confused with critical engagement – the response to such assaults is not uncritical support for what scientists like Paul Crutzen or Will Steffen say.

My observations above speak to possible lines of future inquiry by geographers what will be referenced directly or indirectly to the proposition that the Holocene is at an end. If plausible, these observations also suggest roads that will not, for various reasons, be travelled by many. Let us try to identify them.

First, for many decades human and physical geographers have not been close students of each others' research, with many environmental geographers favouring one or other 'side' of the society-environment nexus in their inquiries. Notwithstanding their encompassing meaning and implications, the Anthropocene and planetary boundaries ideas are unlikely to alter this state of affairs greatly. Differences of experience, knowledge and vocabulary – that is to say, specialisation – cut-deep in the discipline. Thus, even supposing he wanted to, a biogeographer like Erle Ellis would probably find it hard to key-in to the esoteric writings authored by 'geophilosophers' such as Nigel Clark and Kathryn Yusoff. By default, if not by design, a division of intellectual labour is likely to continue wherein physical geographers focus largely on 'science' questions, leaving others in the discipline to study human values, decisions, relationships and institutions. These others would themselves be divided by topics, approaches, methods and so on – something Hulme (2008) has detected in geographers' investigations of climate change, notwithstanding this subject's potential to produce new collaborative or intra-disciplinary approaches.

There would, of course, be exceptions – as when geographers inhabit interdisciplinary research centres or win grants to undertake team research within avowedly multi-disciplinary funding programmes. But one suspects that more quotidian forms of mutual learning are unlikely, such is the intellectual inertia resulting from Geography's striking heterodoxy. This is especially likely when human geographers comment critically on environmental science. Though Diana Liverman has paid close attention to insights emanating from the 'anthropology and sociology of science' and 'critical social science' more widely (see, for instance, Liverman [2009]), not many other physical or environmental geographers are disposed to have their publications analysed by their human counterparts. Conversely, relatively few human geographers feel equipped to open the 'black box' of environmental science, preferring to focus on all those things listed earlier. In this context, a polymathic geographer like Hulme is a rarity. For many years an out-and-out climate scientist, he has of late developed considerable literacy about the social dimensions of environmental science – from knowledge production through communication to science-led public policy to the way global science is 'handled' by ordinary people living local lives (see, for instance, Hulme [2011]). He values strands of human geography as much for what they can tell us about environmental

science, as for what they can tell us about the 'human dimensions' of life in a climate-changed world.

Secondly, where a few physical and environmental geographers are willing to make grand claims about present and future biophysical changes, there are fewer human geographers willing to make equivalent claims about the desired shape of a society-to-come. This sort of programmatic thinking is fairly common in some social science disciplines (e.g. economics), and it continues to attract the attention of governments and quasi-governmental bodies looking for coherent and defensible policies. For instance, The United Nations Environmental Program (UNEP) is currently promoting the idea of a 'Green Economy', inspired by ideas emerging from the fields of environmental and ecological economics.[5] However, for complicated reasons, even the most synoptic analysts in human geography – like Marxist geographer David Harvey and his former doctoral student Erik Swyngedouw – rarely offer substantive programmes designed to alter the *status quo*.

Third, and relatedly, there is little capacity in contemporary human geography for 'foresight' – namely, the systematic study of the future assuming that present-day arrangements continue more-or-less unchanged. While there is interesting research into how authoritative actors like governments imagine the future (see, for example, Anderson [2012]), there is so far little appetite for imagining it otherwise. Yet the concepts of the Anthropocene and planetary boundaries invite such foresight at all geographical scales and in cognitive, moral and aesthetic registers. Though many physical geographers are accustomed to forecasting and the use of predictive science, they tend to isolate the biophysical processes from the social aspects when looking ahead (for instance, see Tadaki *et al*. [2014] on applied climatology). Finally, relatively few physical, environmental or human geographers have long or deep experience of operating in a 'mode 2' or a 'post-normal' fashion. Both forms of academic inquiry challenge the 'technocratic' or 'linear model' of science, where 'experts' provide facts, arguments or advice that non-academics are expected to pay attention to. They describe research that is driven by the needs of non-academic constituencies, or where real world 'wicked problems' mean that facts are uncertain, values contested, the stakes for people high, and decisions therefore urgent (see Gibbons *et al*.,1994; Funtowicz & Ravetz, 1993). Such research requires reflexive learning among academics, both from each other and non-academic stakeholders. It would presumably flourish in a world where the ideas of the Anthropocene and planetary boundaries were taken seriously

[5]See the 2011 UNEP Green Economy Report: http://www.unep.org/greeneconomy/greeneconomyreport/tabid/29846/default.aspx.

in society at large. If it did not it would confirm the worst fears of those who believe academic research is too 'ivory tower' or else too easily hijacked by political and economic elites to justify their own preferred courses of action. Yet, despite its wide intellectual band-width and 'grounded' character, Geography is unlikely to unlearn its 'mode 1' habits of inquiry in the near future. Those who *have* unlearnt them (like J-K Gibson-Graham) tend to focus their 'participatory-' or 'action-research' outside the societal mainstream and to be few in number.[6]

Note that I am not at this point itemising these likely absences in order to offer implicit criticism. Whether they are a 'good' or 'bad' thing is a question of perspective. It is to perspectives on what ought to happen that we now turn by way of a finale to this three paper review.

## A new Geography for a new world?

Though the inventors of the Anthropocene and planetary boundaries ideas resist offering explicit normative judgements about the future, their concepts nonetheless clearly imply a need for non-trivial change to the entire fabric of modern life. They echo the messages emanating from the more outspoken climate scientists (like Professor Kevin Anderson of Manchester University) and radical environmentalists (like George Monbiot, Clive Hamilton and Bill McKibben). This necessarily implies change in the way much of the university research community conducts itself. After all, a new mode of life requires novel modes of knowledge (in terms of it creation, content and dissemination/sharing). Looking at Geography in a wider academic and real world context, how might various practitioners judge the future scenario presented in the previous section? As we will now see, some of the answers suggest alternative scenarios that, while they may appear desirable to some, are currently infeasible. I present these responses as archetypes that represent recurrent and enduring views on Geography evident in over 30 years of published debate on the 'state of the subject'. There are four to consider.

In the sub-section entitled 'Possible trends' I suggested that future geographical research about a post-Holocene Earth is likely to span the full range of topics and approaches, but remain fairly disparate (and contain some gaps, as itemised in the subsequent sub-section). I suggested too that while geographers collectively might have a lot to say about different (and varied) aspects of the Anthropocene and planetary boundaries, Geography might not be perceived by others as a distinctive contributor to wider discussions. One

[6]Some of Gibson-Graham's writings were discussed in Xxxxxxx (2014b). Those who have worked in the mainstream are especially clustered in the UK, and often inspired by work in science and technology studies on public participation in 'expert decision making'. A good recent example is the project on Sarah Whatmore and colleagues on flood management (e.g. Landström *et al*. 2011).

view on this – let us call it 'realist' or 'pragmatist' – is positive. It recognises the high barriers to generalised intellectual exchange within Geography. It is content to see geographers speaking to – and sometimes working with – a range of individuals, communities or organisations (academic and non-), all without the need for coordination or a common language. It further recognises that geographers cannot study everything, let alone synthesise knowledge into some Comtean whole.[7] It also highlights the different forms of 'intra-' and 'inter-disciplinary' working emergent from varied collaborations by geographers, themselves framed by diverse research funding programmes on socio-environmental change. In this view, geographers can perform valuable analytical and normative work, without Geography as a whole being reconfigured so as to be the quintessentially 'Anthropocenic subject'. If this work is varied then – the argument goes – this reflects both the unavoidability of specialisation, the contingencies of collaboration, and the fact that knowledge is plural, especially when morals and values are part of the story. It also reflects the many and varied clients and stakeholders a discipline as 'wide band' as Geography connects to, so too its external academics audiences across the faculties.

Another view – let us call it 'aspirational' – regards the above perspective as too sanguine. Following on from older arguments presented by the likes of David Stoddart (1987), it might perceive the failure of geographers to join forces in the analysis of a post-Holocene world a lost opportunity – both for the discipline and the wider society that might otherwise benefit from having a more 'joined-up' Geography at its service. As Carol Hardman recently opined in the pages of the *Annals of the Association of American Geographers* (*AAAG*) "As the need for human-environment research grows, the opportunity costs to Geography of not bringing our intellectual resources to bear are great" (2012: 745). She continues: "If Geography is a disciplinary doughnut, with important gaps at the centre of its intellectual space, then we have a research frontier right at our core" (*ibid*.). In this light, any future failure of the Anthropocene and planetary boundaries hypotheses to make geographers at last fill-in the gaps would be seen as perhaps the ultimate failure. After all, someone like Hardman might argue, what grander concepts do we have than these to remind geographers that 'integrated analysis' (and public policy) is not only desirable but absolutely necessary? In the aspirations view, frequently voice in the pages of the *AAAG* (e.g. Skole, 2004), these concepts are a further opportunity to secure Geography's status as a 'synthesis subject'.

[7]The French Enlightenment polymath Auguste Comte famously imagined reality to be a huge jigsaw, wherein each piece could be understood and integrated into a coherent picture over time through systematic inquiry.

A third view – we can this one 'pessimistic' – regards the first one as too self-satisfied, while regarding the second as insufficiently attentive to the wide range of forms 'integrated analysis' can take. Yet it also doubts Geography can be changed for the better, even in the face of looming ecological threats of the sort that Johan Rockström and colleagues foresee (Rockström *et al*., 2009). This view is fairly common on the political Left of human geography and has already been articulated in respect of research on ACC and GEC. For instance, Swyngedouw – mentioned earlier – might point out that (i) physical and environmental geographers like Ellis, Lambin, Lenton and Liverman find their research being used in 'post-political' ways, like it or not, while (ii) radical ideas (such as those proposed by Clark and Yusoff) tend either to be ignored by those in positions of societal influence or to be disconnected from organised political movements who want to change the world by seizing power (see Swyngedouw, 2012). This pessimistic view is presented as 'realist' in the same sense the first is, seeing the same glass as half empty not half full.

By contrast, a final view – this one might be labelled 'can do' – believes that geographers and fellow-travellers can be steered in new directions, even if not all practitioners are in the end affected. It would thus express disappointment if my 'possible trends' eventuated, not so much for the sake of Geography as a discipline but for the wider world. This is because proponents of the 'can do' view share Ellis's, Lenton's, Liverman's and Lambin's conviction that without metaphorically signing a new 'social contract' with society, researchers of 'global environmental change' will continue to fail the governments and citizens it needs to serve (see DeFries *et al*. 2013). Pessimists would doubtless highlight the risk that this contract merely renders research a servant of special interests once more. But the 'can do' view suggests that the social authority of academics remains sufficiently high that, if enough specialists can join forces to offer bigger insights and suggest novel solutions, then non-academics will listen – especially if the insights and solutions are emergent from 'mode 2' and 'post-normal' inquiries. This view has recently been put forward by University of Oslo geographer Karen O'Brien (2013), though not with direct reference to the proposition that the Holocene has ended. Inspired by a recent European Union foresight project entitled RESCUE (Responding to Environmental and Social Challenges for our Unstable Earth), she enjoins geographers to change each other's habits and help to change the wider world by (i) showing that the Earth surface is, and will continue, to *change significantly* because of human activity, and (ii) that humans must therefore *substantially alter* the norms and practices that underpin unchecked

environmental change globally (see also O'Brien *et al*., 2013).[8] In O'Brien's view, Geography's unique breadth offers huge resources for generating new arguments and propositions about how people might decide to change in the face of the large-scale biophysical changes many geoscientists now regard as inevitable. This is not the same as saying there is one way to fill the centre of the 'disciplinary doughnut'. But, for her, it will involve an across-the-board alteration in many geographers' *modus operandi* and a conscious challenge to academic inertia and slow disciplinary evolution.

As indicated above, these views are archetypes but not, I hope, stereotypes. They are plausible representations of how different geographers might judge the future scenario sketched earlier on. Depending on which (if any) of them were to prevail, the sorts of contributions that geographers might make to future discussions of the Anthropocene and planetary boundaries would vary significantly. The first and third perspectives both, for different reasons, do not foresee the need or opportunity for a 'step change' in the way geographers interrogate anthropogenic environmental change and its knock-on effects. The second and fourth, by contrast, see both need and opportunity, with the last one insistent that Geography has an obligation to use its varied intellectual tool-kit to change the world at large. It might thus regard the Anthropocenic writings of the human geographers reviewed in Xxxxxxx (2014b) as being either too 'academic' or too fixated on 'local' issues and actors outside the mainstream to qualify as 'transformative'.

What we should perhaps hope for, looking ahead, is some sort of real engagement between advocates of these four views (and others I have no doubt missed out here). Through such engagement comes the possibility for mutual change – and only a true conservative could oppose that in a world where more of the same seems hard to justify on ecological and other grounds. We might hope too that, in whatever ways they end-up doing it, geographers avoid making the Anthropocene and planetary boundaries largely academic matters of interest to researchers but few others. Though both concepts could, in the end, amount to no more than catchwords in ascendancy, I wager they will travel beyond the university world and shape discourse and policy in other arenas. For this reason, it would be good not only to hitch a ride on these two semantic wagons, but to help rebuild them as they traffic within and beyond academic disciplines. Though their meanings and implications are far from settled, there is an opportunity for new dialogues, ideas and practices to

[8]RESCUE is just one recent attempt by research funding bodies to actively create new paradigms of inquiry that can break-out of the perceived strait-jackets that most academic disciplines have created for their practitioners.

emerge by embracing the terms' potential to make us ask hard questions and come up with engagingly novel answers.

## Conclusion

This paper (and its companion essays) has been written at a time when 'the Anthropocene' is a buzzword, an adolescent concept that may mature into a societal keyword. The related idea of 'planetary boundaries' is much younger, but could also become part of the public *lingua franca* in time. If this eventuates, geographers will not – or certainly should not – be passive spectators who simply witness others investing the Anthropocene and planetary boundaries ideas with particular meanings that, in turn, may shape public policy, commercial decision making, and so on in significant ways. Instead, they stand to be among the semantic weather makers who, through their individual and collective efforts as researchers, teachers and concerned citizens, can actively participate in determining the frames of reference others use to comprehend life in a world where humans are said to be the equivalent of a geological force.

In the meantime, geographers' collective discussions of humanity's status as a powerful 'natural element' could – if they so wish – engender new forms of engagement across the long lamented 'divide' that often keeps human and physical geographers ignorant of (even indifferent towards) each other's endeavours. Equally, they may inspire new connections between sub-fields of human and physical geography. By 'new' I mean forms that transcend the all-too-familiar (and thankfully unrealistic) aspiration for a holistic approach, one that presumes the world to be a metaphorical jigsaw waiting for the right people to join all the pieces together to reveal a single picture. In my view, the Holocene's end – if one chooses to acknowledge it – does not stand as a 'problem' of analysis and policy action waiting to be 'solved'. It is perhaps best understood as an incitement to explore the full spectrum of problem definitions and suggested responses reflective of human disagreements about the right way to live on Earth. Geography is unusual compared to other subjects in that this spectrum is considered within a single disciplinary space. But how much do most practitioners take advantage of this extraordinary range? Borrowing Hulme's (2011) argument about ACC, we can ask not what geographers should 'do' about the Anthropocene's onset, but what debates about a new epoch in Earth surface history can do for us and all those who stand to be affected by such debates. Without in any way romanticising the discipline's capacity to be 'different', it occupies a fairly unique place among all those subjects who will have something to say about a post-Holocene world. That difference should, and may, count for something important.

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